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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,572	07/21/2004	XIAOGUO TANG	81105976	4571

32242 7590 07/12/2005

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EXAMINER

TRAN, BINH Q

ART UNIT PAPER NUMBER

3748

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/710,572

Applicant(s)

TANG ET AL.

Examiner

BINH Q. TRAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 07/21/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Receipt and entry of Applicant's Preliminary Amendment dated March 23, 2005 is acknowledged.

Double Patenting

Claims 1-26 are rejected under the judicially created doctrine of double patenting over claims 1-15 of U. S. Patent No. 6,779,337 B2 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: the application claims are merely broader than the patent claims.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 4-9, and 11-26 are rejected under 35 U.S.C. 102 (b) as being anticipated by Collier, Jr. (Collier) (Patent Number 6,405,720 B1).

Regarding claims 4, 7, 14, 18, and 24, Collier discloses a method and apparatus for operating a hydrogen fueled spark ignition engine (2) having an associated lean NOx trap (14), the method comprising: providing substantially premixed air and hydrogen to a combustion

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chamber of the engine wherein said air and hydrogen are at an equivalence ratio of approximately unity; and providing residual gases to the combustion chamber, with the mass of the residual gases exceeding 40% of the total mass of gases provide to the combustion chamber (e.g. See col. 7, lines 14-42); operating the engine at a lean air/fuel ratio with a first level of residual exhaust gases; determining when to purge the associated lean NO_x trap; and enriching the air/fuel ratio and increasing the residual exhaust gases to avoid auto ignition while purging the NO_x trap in response to a purge determination; and supplying hydrogen to the lean NO_x trap in response to the step of determining when to purge (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 5, Collier further discloses that the residual gases comprise engine exhaust gas trapped in the combustion chamber from a prior combustion event and engine exhaust gas recirculated to the combustion chamber (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 6, Collier further discloses that the engine has a three-way catalyst disposed in an exhaust system connected to the engine (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 8, 20, Collier further discloses that the step of enriching the air/fuel ratio comprises reducing the air/fuel ratio to about a stoichiometric air/fuel ratio (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claims 9, and 25, Collier further discloses that the step of enriching the air/fuel ratio comprises reducing the air/fuel ratio to a ratio rich of stoichiometry (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 11, Collier further discloses that the residual exhaust gases comprise exhaust gas recirculation and exhaust gas trapped in a combustion chamber from a previous combustion event (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 12, Collier further discloses that the step of enriching the air/fuel ratio and increasing the residual exhaust gases comprises increasing the residual exhaust gases to about 40-40% of the mass of air and fuel (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 13, Collier further discloses that the engine is a port fuel injected internal combustion engine (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 15, Collier further discloses that the enriching the air/fuel ratio to operate the engine at an equivalence ratio not less than unity during purging of the lean NO_x trap (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 16, Collier further discloses that the step of supplying hydrogen comprises supplying hydrogen downstream of a combustion chamber of the engine and upstream of the lean NO_x trap during purging of the lean NO_x trap (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claims 17 and 26, Collier further discloses that the increasing mass of residual exhaust gases relative to mass of air and fuel to reduce auto ignition during purging (See col. 5, lines 17-67; col. 6, lines 1-67; col. 7, lines 1-14).

Regarding claim 19, Collier further discloses an EGR system for providing recirculated exhaust gas to the engine; wherein the controller operates the EGR system to increase EGR flow

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during purging of the lean NOx trap to reduce auto ignition of the gaseous hydrogen fuel (e.g. See col. 7, lines 14-42).

Regarding claim 20, Collier further discloses that the engine operating conditions include engine operating time (e.g. See col. 7, lines 14-42).

Regarding claim 21, Collier further discloses that the engine operating conditions include engine speed and load (e.g. See col. 7, lines 14-42).

Regarding claim 22, Collier further discloses that the controller operates the fuel system to enrich the air/fuel ratio during purging of the lean NOx trap (e.g. See col. 7, lines 14-42).

Regarding claim 23, Collier further discloses that the controller operates the fuel system to provide an equivalence ratio of not less than unity during purging of the lean NOx trap (e.g. See col. 7, lines 14-42).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collier in view of design choice.

Regarding claims 1, and 10, Collier discloses all the claimed limitation as discussed above except the engine is operating at an equivalence ratio of about 1.1 when purging the lean NOx trap.

Regarding the specific range of the equivalence ratio of the engine, it is the examiner's position that the equivalence ratio of about 1.1, when purging the lean NO_x trap, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as the size of the engine, as well as mass flow rate of the exhaust gas, the engine operation conditions, the properties of materials for making the catalytic converter, and the controlled temperature of the catalytic converter. Moreover, there is nothing in the record which establishes that the claimed parameters present a novel or unexpected result (See *In re Kuhle*, 562 F. 2d 553, 188 USPQ 7 (CCPA 1975)).

Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. *In re Dreyfus*, 22 CCPA (Patents) 830, 73 F.2d 931, 24 USPQ 52; *In re Waite et al.*, 35 CCPA (Patents) 1117, 168 F.2d 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. *In re Swenson et al.*, 30 CCPA (Patents) 809, 132 F.2d 1020, 56 USPQ 372; *In re Scherl*, 33 CCPA (Patents) 1193, 156 F.2d 72, 70 USPQ 204. However, even though applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. *In re Sola*, 22 CCPA (Patents) 1313, 77 F.2d 627, 25 USPQ 433; *In re Normann et al.*, 32 CCPA (Patents) 1248, 150 F.2d 627, 66 USPQ 308; *In re Irmischer*, 32 CCPA (Patents) 1259, 150 F.2d 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; *Minnesota Mining and Mfg. Co. v. Coe*,

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69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

Regarding claim 2, Collier further discloses the step of operating the engine with the mass of EGR being approximately equal to the mass of air and fuel when the lean NO_x trap is being purged (e.g. See col. 7, lines 14-42).

Regarding claim 3, Collier further discloses the step of operating the engine with the mass of EGR being approximately equal to the mass of air and fuel when the lean NO_x trap is being purged and when the engine is operating at or near maximum load (e.g. See col. 7, lines 14-42).

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of five patents:

Collier et al. (Patent Number 5787,864), Klopp (Patent Number 5520,161), Murphy et al. (Patent Number 6122,909), Oshima et al. (Patent Number 5412946), and Noguchi et al. (Patent Number 4230072) all disclose an exhaust gas purification for use with an internal combustion engine.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (571) 272-4865. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (571) 272-4859. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BT
July 08, 2005



Binh Q. Tran
Patent Examiner
Art Unit 3748